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1,146,895

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,146,895

Date of Application and filing Complete Specification: 18 May, 1966.

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Int. Cl.:—B 65 g 17/28

COMPLETE SPECIFICATION

Improvements in or relating to Conveyor Belt Arrangements

I, BERNHARD WESTBROCK, a German citizen, of 4401 Westbevern, Westfalia, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to conveying apparatus and particularly to endless conveyor belts.

It is an object of the invention to provide a conveyor belt which is capable of a wide range of adjustment and is therefore suitable for solving a large number of conveying problems.

The invention consists in a conveyor belt arrangement comprising a first substantially horizontal endless conveyor belt whose useful length is adjustable over a wide range, and a second endless conveyor belt immediately adjacent said first belt and whose inclination is adjustable upwardly from substantially horizontal to an angle relative to the horizontal, the pulleys at adjacent ends of the conveyor belts being connected in fixed relation to one another at substantially the same height.

Said adjacent end pulleys may be driven at a common velocity, for example by being driven through a common transmission means.

In one embodiment said first belt passes over a second pulley located adjacent its said end pulley and between said end pulley and the other end pulley of said first belt, and over a third pulley spaced beyond the end of said end pulley, the distance between said third pulley and said other end pulley being fixed. Said third pulley and said other pulley are mounted on a common support, comprising two side pieces spaced apart with the pulleys therebetween, with the other end pulley mounted on an offset portion of the support at about its own diameter above said third pulley. The support is movable in a sliding guide, on which both said adjacent end pulleys are located, and track-supporting rollers for the useful length of the conveyor belt are arranged on sliding supports which are connected together by a lazy tongs arrangement at equal distances from one another. A flat rod which is adjustable by means of eccentrics is advantageously arranged between the side pieces of said support on a parallel guide having swivel arms attached to one of the continuous supports, and this rod can be securely fixed in a key way which is attached to the sliding guide. The rod may be under the effect of a tension spring.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings, which show an embodiment thereof by way of example and in which:—

Figure 1 shows a perspective view of a conveyor belt arrangement,

Figure 2 shows a side view of the arrangement of Figure 1 in section,

Figure 3 shows a section along the line III—III of Figure 2,

Figure 4 shows a section, on a smaller scale, along the line IV—IV of Figure 2,

Figure 5 shows a section along the line V—V of Figure 4,

Figure 6 shows a section of the upper end of the arrangement broken away,

Figure 7 shows a side view corresponding to Figure 6,

Figure 8 shows an enlarged section from Figure 7,

Figure 9 shows a section along the line IX—IX of Figure 7 and

Figures 10 to 14 show a conveyor belt arrangement according to the invention in side view in various positions of use.

Referring now to the drawings, a conveyor belt arrangement according to the invention consists essentially of a support frame 1, a first substantially horizontal endless conveyor belt 2, whose useful length can be adjusted within wide limits and a second endless conveyor belt 3 whose angle can be adjusted. The main

[*Price 4s. 6d.*]

frame here has a framework which is formed by U-supports, viz longitudinal supports 4 and cross supports 5, which are secured at the top to the longitudinal supports, for example by welding. Wheels 6 are arranged below the longitudinal supports 4 which can partly be constructed as castors. A further cross support 7 is arranged between the supports 5 and the longitudinal supports 4 and longitudinal frame supports 8 are mounted thereon. Cross supports 9 are arranged on the frame supports 8 on which a sliding guide 10 is arranged. This sliding guide consists of a frame with longitudinal supports 11 and cross supports 12 and at each corner of the frame there are arranged upright bearings 13 on which upper pulleys 14 and lower pulleys 15 are rotatably mounted.

One end pulley 21 of the horizontal conveyor belt 2 is rotatably mounted on the frame 10 of the sliding guide, and the lower end pulley 23 for the conveyor belt 3, whose angle of inclination can be adjusted, is also mounted on the frame 10, immediately adjacent the end of pulley 21. Between the end pulley 21 of the horizontal conveyor belt and the lower end pulley 23 of the inclinable conveyor belt 3, there is a transfer position between both conveyor belts. Both end pulleys 21 and 23 are driven via a chain drive 24 by the driving wheel 25 of a motor 17, which motor is arranged in the frame 10 of the sliding guide. The other end pulley 19 of the horizontal conveyor belt 2 is mounted at the front end of a support 16 comprising spaced apart side pieces arranged so as to move horizontally between the pulleys 14 and 15 of the sliding guide. As will be seen from Figure 1, the pulley 19 is rotatably mounted between offset portions 18 of the side pieces of the support 16. Another pulley 22 is mounted on the frame 10 of the sliding guide, adjacent the end pulley 21 and between the end pulleys 21 and 19. This pulley 22 is arranged slightly lower than the pulley 21. A further pulley 20 is mounted beyond the end pulley 21 between the rear ends of the side pieces of the support 16. The pulley 20 is arranged at about the diameter of the pulley 19 below the latter.

The horizontal conveyor belt 2 passes around the pulleys 21 and 22, i.e. it is located on the upper side of the pulley 19 coming onto the upper side of the pulley 21, then passes therearound and from the lower side of the pulley 21, to the upper side of the pulley 22 and from its lower side then to the upper side of the pulley 20, and from there it passes back from its lower side to the lower side of the front and pulley 19. The horizontal conveyor belt is in this way always held with part of its upper run used for the conveying at the same height and distance from the lower end pulley 23 of the conveyor belt 23. On the other hand, the part of the upper run of the horizontal conveyor belt not used for the horizontal conveying is guided by the pulleys 21 and 22 below the end pulley 23 so that it does not hinder the latter.

The part of the upper run of the conveyor belt 2 used for the conveying is held by small rollers 26, which are rotatably mounted on supports 27. These supports 27 are movably mounted on the upper side of the support 16 and are connected to one another by a lazy tongs arrangement 28, so that they are always at constant distances from one another, whenever the useful length of the horizontal conveyor belt is adjusted.

The adjustment of the useful length of the horizontal conveyor belt 2 is effected by moving the support 16 in the sliding guide between the pulleys 14 and 15. The front end pulley 19 can be adjusted within wide limits with respect to the rear end pulley 21. If the front end pulley 19 is adjusted close to the rear end pulley 21, the rear guide pulley 20 projects with the support 16 a long way to the rear and if the front end pulley 19 is far removed from the rear end pulley 21 the rear guide pulley 20 is located near the lower end pulley 23 of the belt 3 and the sliding guide. In the latter case, the track supporting rollers 26 for the useful length of the conveyor belt 2 are separated far from one another, but they are the same distance from one another by reason of the effect of the lazy tongs arrangement 28.

In order to fix the adjustment of the horizontal conveyor belt 2, for different useful lengths, a flat rod 30 is mounted for adjustment by means of an eccentric 31, on one of the side pieces of the support 16 by means of a parallel guide comprising swivel arms 29. The eccentric 31 is rotated by means of a hand lever 32. A block 61 with a key way 62 is arranged on the traverse support 12 of the frame 10 of the sliding guide. The flat rod 30 engages in the key way 62 and can be adjusted by means of the eccentric 31 and the parallel guide with the swivel arms 29 within the key way 62 in such a manner that it penetrates more deeply into the key way or is withdrawn therefrom. The arrangement is such that the flat rod can be securely wedged in the key way 62 by means of the eccentric and the sliding guide. It must be recognised that when loosening the flat rod from the key way, the supports 16 can be pushed in the sliding guide so that the usable length of the horizontal belt 2 is to be adjusted in the desired manner, then the flat rod 30 is tightened in the key way 62 by means of the eccentric, and the selected adjustment of the usable length of the horizontal conveyor belt 2 is therefore fixed. For maintaining the flat rod 30 in the key way 62, a tension spring 33 is arranged on the end opposite the eccentric 31, said spring being suspended from a cross beam 34 on the longitudinal support 16.

The conveyor belt 3, whose angle is inclin-

able, consists of two longitudinal supports 35 which are pivotable about the rotatational axis of the lower end pulley 23 and between which a number of track-supporting rollers 36 for the upper run of the conveyor belt are rotatably arranged. An upright 38 is articulated to a bearing 37 at a distance from the point of rotation of the support 35, below said support, which upright is movably guided on its lower end in the frame supports 8. These frame supports 8 are for example constructed as U-sections and their opening is on the side. A pulley 39 runs on the lower cross piece of the U-section, this pulley being connected with the lower end 40 of the upright 38. A toothed rack 41 running within the U-section is pivoted for example to the pulley 39. A pinion 42 is rotatably mounted on the frame support 8 and engages in the toothed rack 41. The pinion 42 can be rotated by means of a crank handle 43. It should be noted that the toothed rack 41 can be moved within the frame support 8 by means of the crank handle and the pulley 39 is suspended from the lower end 40 of the upright 38. Thereby the angular position of the supports 35 and consequently the inclination of the conveyor belt 3 can be adjusted to any degree within wide limits.

The upper end of the conveyor belt 3 can be separated off, namely a jaw 44 is arranged on the upper end of the longitudinal support 35, in which the swivel and supporting point for the outer separable end of the conveyor belt is located. Two upper track supporting rollers 45 and 46 for the upper seam of the conveyor belt are for example rotatably mounted in the jaw 44 and the upper track carrying roller 46 is for example the point of rotation and articulation for the short supports 49 of the removable part of the conveyor belt. The lower track supporting roller 47 which supports the return of the lower run of the conveyor belt from below, is rotatably arranged on the lower end of the support 49.

The jaw 44 is downwardly extended to form a cross beam 50, and a rod 51 is pivoted to the lowermost end of this cross beam 50. Said rod 51 is guided below the support 49 about as far as its end, in holders 52. The last holder 53 is constructed in the form of a clamp 54 gripping the rod 51, which clamp can be tightened by means of a screw 55. The screw 55 is operated by means of a handle 56. Between the last holder 53 and the penultimate holder 52 for the rod 51, there is arranged a shoulder 57 on the rod 51 and between the shoulder 57 and the last holder 53 there is fixed a compression spring 58. This spring 58 receives a part of the weight of the removable end 48 of the conveyor belt; it serves to relieve the weight. From the preceding description it can be seen that the rod 51 serves to support the removable part 48 of the conveyor belt, of course, this arrangement is adapted to both sides beneath the supports 49 of the removable part and this supporting rod 51 opposite the supports 49 can be adjusted by means of the clamps, 51, so that the most varied angles can be adjusted. When loosening the screwed clamp 54, the relief springs 58 serve partly to receive the weight of the removable part. The upper end pulley 59 for the conveyor belt 3 is rotatably mounted on the end of the removable part.

The arrangement according to the invention permits the most varied adjustments, some of the main ones of which are described in Figures 10 to 14. According to Figure 10, the horizontal belt 2 is drawn out to its greatest useful length and the inclinable belt 3 is now horizontal, the removable part of this belt is also horizontal so that a wide horizontal distance can be bridged by the conveyor belt. This adjustment is for example, usable when goods are to be stored in a warehouse. According to Figure 11, the horizontal belt 2 is contracted so that it has only a very small useful length and the inclinable belt 3 is engaged at a small angle and its end is bent downwardly. This adjustment can be used for example when goods are to be loaded on a cargo truck from a warehouse through a fairly high hatch, in this case the belts run in another direction, so that the loading position is at the separated end of the inclinable belt. The horizontal belt 2 can travel further, so that the rear of the loading surface of the truck can be loaded first, and with progressive loading, the useful length of the belt 2 is adjusted to be correspondingly shorter. The adjustment according to Figure 12 can for example be used when goods are to be conveyed from a truck to the first storey of a warehouse through a hatch. As the unloading of the truck progresses, the horizontal part 2 can be moved further forward, so that the loading position of the horizontal conveyor belt follows the progressive unloading. An adjustment of the conveyor belt corresponding to Figure 13 with a correspondingly small difference in height can for example be used when goods are to be moved from one truck to another, or from a ramp to a higher truck. The adjustment according to Figure 14 can be used for example when small sized material, which is to be distributed in piles, is to be loaded elsewhere or is to be unloaded.

In the embodiment shown in the drawings, the arrangement according to the invention is shown with an undercarriage. Of course it can alternatively be constructed in any other manner; it can also be built to be stationary or in the case of a warehouse can be moved laterally. An advantage of the arrangement according to the invention which is to be particularly emphasized consists in that the horizontal belt 2 is adjustable not only horizontally in order to reach the loading or unloading position, but due to the simple possibility of adjustment, the horizontal belt can also be contracted when there is a temporary interruption of the con-

veying process, in order for example that lateral traffic can pass on a loading ramp. The supply is thereby interrupted for only a very short time, the conveyor remains in its position and only the horizontally movable belt is contracted and then extended again.

WHAT I CLAIM IS:—

1. A conveyor belt arrangement comprising a first substantially horizontal endless conveyor belt whose useful length is adjustable over a wide range, and a second endless conveyor belt immediately adjacent said first belt and whose inclination is adjustable upwardly from substantially horizontal to an angle relative to the horizontal, the pulleys at adjacent ends of the conveyor belts being connected in fixed relation to one another at substantially the same height.

2. An arrangement as claimed in claim 1, wherein said pulleys are driven at a common velocity.

3. An arrangement as claimed in claim 2, wherein said pulleys are driven through a common transmission means.

4. An arrangement as claimed in claim 1, 2 or 3, wherein said first belt passes over a second pulley located adjacent its said end pulley and between said end pulley and the other end pulley of said first belt, and over a third pulley spaced beyond the end of said end pulley, the distance between said third pulley and said other end pulley being fixed.

5. An arrangement as claimed in claim 4, wherein said third pulley and said other end pulley are mounted on a common support with said other end pulley being mounted on an offset portion of said support at about its own diameter above said third pulley.

6. An arrangement as claimed in claim 5, wherein said support is movable in a sliding guide, on which both said adjacent end pulleys are mounted.

7. An arrangement as claimed in claim 6, wherein track supporting rollers for the useful length of the first conveyor belt are arranged on sliding supports between said sliding guide and the bearing of said other end pulley, said sliding supports being connected together by a lazy tongs arrangement at equal distances from one another.

8. An arrangement as claimed in claim 5, 6 or 7, wherein said support comprises two side pieces spaced apart with the pulleys therebetween.

9. An arrangement as claimed in claim 8, wherein a flat rod, which is adjustable by means of an eccentric, is arranged between the side pieces of said support on a parallel guide with swivel arms attached to one of the continuous supports and this rod is securely fixable in a key way attached to said sliding guide.

10. An arrangement as claimed in claim 9, wherein the rod is under the effect of a tension spring.

11. An arrangement as claimed in any one of the preceding claims, wherein the second conveyor belt can be bent downwardly at its uppermost part.

12. An arrangement as claimed in claim 11, wherein the bending angle of the uppermost part is adjustable by a rod movably guided on the uppermost part by a clamp, this rod being articulated to a downwardly projecting cross beam of the main frame of the second conveyor belt.

13. An arrangement as claimed in any one of the preceding claims, wherein the inclination of the second adjustable conveyor belt, is variable by means of an upright member articulated to the said belt near its upper end, which upright member is adjustable in a horizontal guide of the main frame.

14. An arrangement as claimed in claim 13, wherein the end of the upright member running in the horizontal guide on the main frame is connected to a toothed rack which can be moved by means of a pinion associated with a crank shaft.

15. A conveyor belt arrangement, substantially as hereinbefore described with reference to the accompanying drawings.

BARON & WARREN,
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London, W.8,
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1146895 COMPLETE SPECIFICATION

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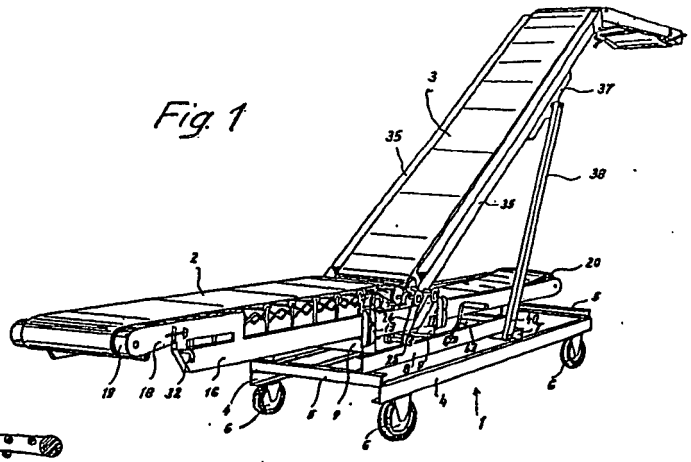

Fig. 1

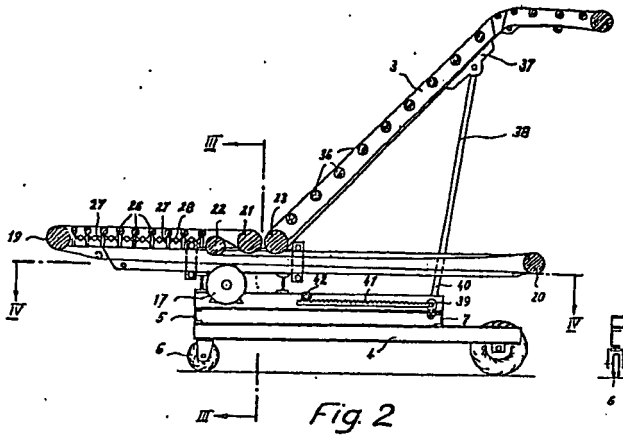

Fig. 2

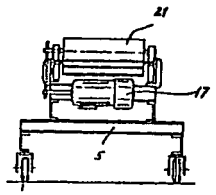

Fig. 3

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Sheet 2

Fig. 4

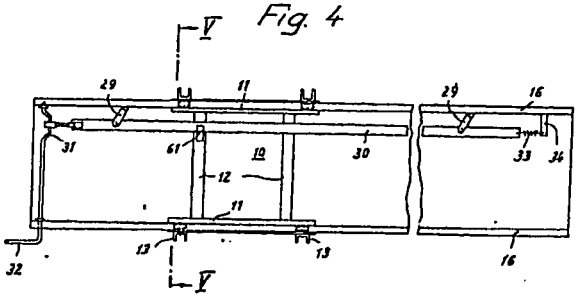


Fig. 5

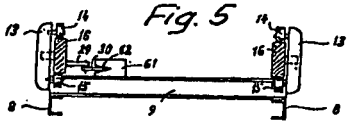


Fig.10

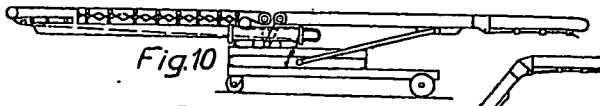


Fig.11

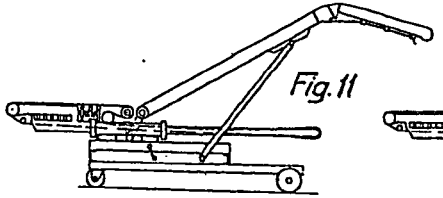


Fig.12

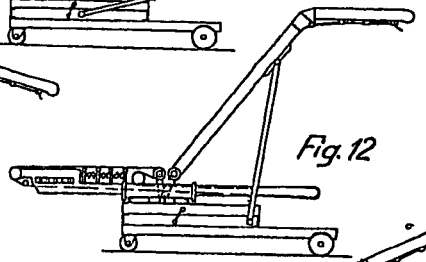


Fig.13

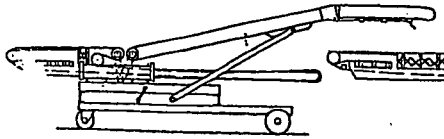
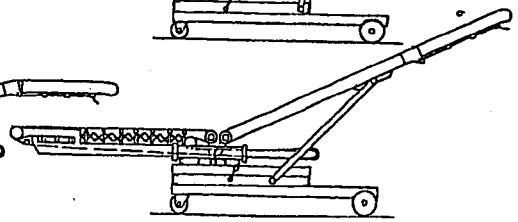


Fig.14



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Sheet 3

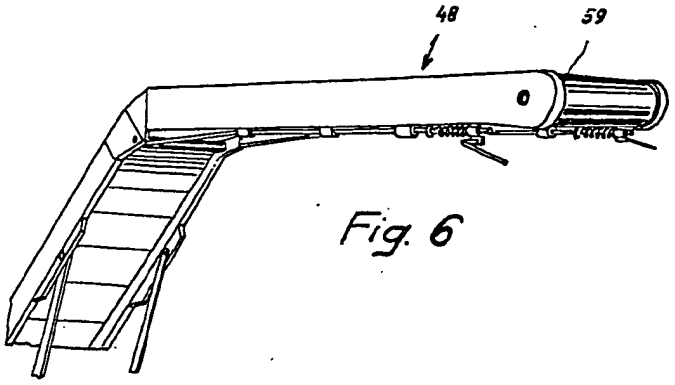

Fig. 6

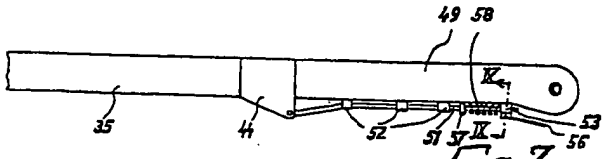

Fig. 7

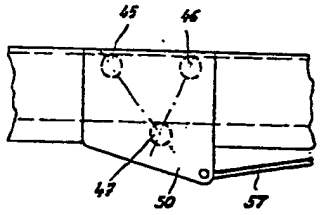

Fig. 8

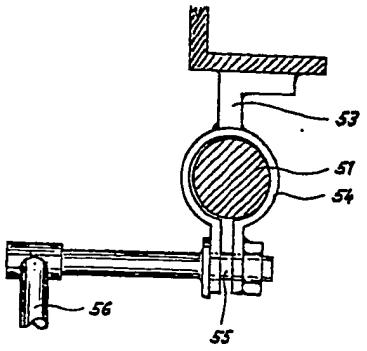

Fig. 9